The differentiation of asteroid (4) Vesta

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The 530-kilometer asteroid (4) Vesta is a rare example of a surviving and relatively intact planetesimal, formed sufficiently early in Solar System history to differentiate by radiogenic heating caused by aluminum-26 decay. Due to the in situ exploration of Vesta by the Dawn spacecraft in the period July 2011 – September 2012, and due to the fact that Vesta is the parent body of howardites, eucrites, and diogenites (HED meteorites), the quantity and quality of empirical data on Vesta are exceptionally good. I here review the compositional, mineralogical, petrological and magnetic properties of HED meteorites that are relevant for the differentiation process, particularly focusing on results on absolute and relative radiometric dating. These properties are placed in context by reviewing key Dawn observations, as well as results from numerical thermophysical evolution models obtained by myself and others.